

3.1 Huber Goniometer

For the θ -rotation of the crystal, a Huber goniometer, Model 440 is used. With the 10:1 gear reducer available with this model, a resolution of 0.0005° is achieved for a full step of the stepping motor. The range of rotation is -15° to 180° . Negative rotations of the crystal can be used for the measurement of absolute Bragg angles using spectral features of the undulator radiation. The comparatively large range of rotation will allow Laue diffraction experiments in the future.

The goniometer is seated on top of a centralizing plate (Fig. 1) that is pre-aligned with the center of rotation of the detector mechanism. Three risers attached to the goniometer (the middle one is depicted in the figure) support the vacuum chamber enclosure for the silicon crystal. A rotary feedthrough with differential pumping allows the crystal assembly to rotate relative to the vacuum chamber.

3.2 Detector Positioning Mechanism

The detector components are assembled on top of the detector mounting plate (see plan view in Fig. 2). The mounting plate is fastened to three carriers riding on two radial tracks of 300 mm and 500 mm radius. One of the carriers is linked to a rod-less screw-driven linear actuator. The actuator, with its stepper motor and reducer assembly, travels on linear tracks as it drives the attached carrier on circular tracks. This mechanism provides a minimum angular resolution of 0.0002° . The resolution, which depends on the motor torque requirement for the mechanism, is better than the required resolution by a factor of 10.

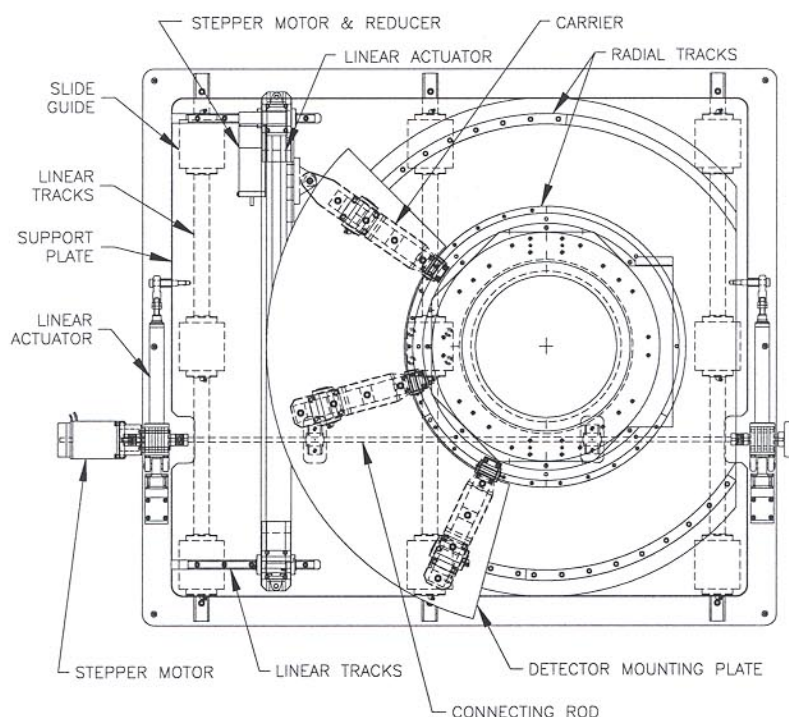


Fig. 2: Detector positioning mechanism shown with horizontal translation stage.